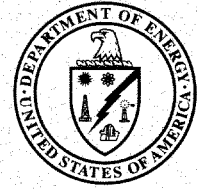


DOE/ID-11028
Revision 0
February 2003



U.S. Department of Energy
Idaho Operations Office

**Waste Area Group 4 Remedial Design/Remedial
Action Work Plan, CFA-04 Pond
Mercury-Contaminated Soils,
Operable Unit 4-13**



Idaho National Engineering and Environmental Laboratory

**Waste Area Group 4 Remedial Action/Remedial
Design Work Plan, CFA-04 Pond
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February 2003

**Prepared for the
U.S. Department of Energy
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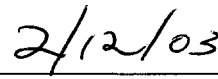
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February 2003

Approved by:



Julie A. Sherwood
WAG 4 Project Manager



Date

ABSTRACT

This report describes the remedial design/remedial action for Waste Area Group 4, Operable Unit 4-13. The Central Facilities Area-04 Pond Comprehensive Environmental Response, Compensation, and Liability Act site is included in this response action to mitigate the noncarcinogenic human health and ecological risks due to exposure to mercury contamination in the pond's soil. The primary remedial action objective for the Central Facilities Area-04 site is to prevent exposure to mercury concentrations above the final remedial action goal of 8.4 mg/kg. All contaminated soil exceeding the final remediation goal of 8.4 mg/kg will be excavated and disposed of at an approved on-Idaho National Engineering and Environmental Laboratory disposal facility, either the Idaho National Engineering and Environmental Laboratory Comprehensive Environmental Response, Compensation, and Liability Act Disposal Facility or the Central Facilities Area landfill. The mercury final remediation goal has been changed since the Operable Unit 4-13 Record of Decision was finalized. After new information recently became available from U.S. Environmental Protection Agency sources, a reevaluation of the final remediation goal for mercury was done for both human and ecological receptors. This new final remediation goal was adopted based on prerediation sampling results at the pond that confirmed the assumptions that were made in the reevaluation. An Explanation of Significant Differences to the Record of Decision will document this change. Contaminated soil with mercury concentrations exceeding the Resource Conservation and Recovery Act toxicity characteristic leaching procedure concentration of 0.2 mg/L will be excavated, stabilized, and dispositioned at the Idaho National Engineering and Environmental Laboratory Comprehensive Environmental Response, Compensation, and Liability Act Disposal Facility. Field screening of remaining soil for mercury content will be conducted to determine whether the remediation goal has been met and to ensure that the excavated soil does not exceed the disposal facility's waste acceptance criteria. Verification sampling will be performed to demonstrate that the final remediation goal has been met. Subsequent to final verification, the excavations will be backfilled. The surrounding soil will be used to decrease the steepness of the grade and provide a smooth transition from the higher surrounding grade. Then, the soil will be revegetated with native plant species. Long-term institutional controls are not anticipated for the Central Facilities Area-04 pond, but will be evaluated upon completion of the soil removal and verification sampling.

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ACRONYMS

ARAR	applicable or relevant and appropriate requirement
BBWI	Bechtel BWXT Idaho, LLC
CEL	Chemical Engineering Laboratory
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
EDF	Engineering Design File
EPA	U.S. Environmental Protection Agency
FFA/CO	Federal Facility Agreement and Consent Order
FRG	final remediation goal
FY	fiscal year
HWD	hazardous waste determination
ICDF	INEEL CERCLA Disposal Facility
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
INEEL	Idaho National Engineering and Environmental Laboratory
LDR	land disposal restriction
MCP	management control procedure
NESHAP	National Emission Standards for Hazardous Air Pollutants
OU	operable unit
PDD	program description document
PLN	plan
RAO	remedial action objective

RCRA	Resource Conservation and Recovery Act
RD/RA	remedial design/remedial action
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
SOW	Scope of Work
SWPPP	Storm Water Pollution Prevention Plan
TBC	to be considered
TCLP	toxicity characteristic leaching procedure
TPR	technical procedure
WAG	waste area group

Waste Area Group 4 Remedial Design/Remedial Action Work Plan, CFA-04 Pond Mercury-Contaminated Soils, Operable Unit 4-13

1. INTRODUCTION

In accordance with the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991) between the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the State of Idaho Department of Environmental Quality (IDEQ)—hereafter referred to as “the Agencies”—DOE submits this Remedial Design/Remedial Action (RD/RA) Work Plan for the Central Facilities Area (CFA) -04 pond. Under the current remediation management strategy outlined in the Federal Facility Agreement and Consent Order (FFA/CO) (DOE-ID 1991), the location identified for the remedial action is designated as Waste Area Group (WAG) 4, Operable Unit (OU) 4-13 at the Idaho National Engineering and Environmental Laboratory (INEEL).

The OU 4-13 remedial action—as part of the “Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA/Superfund)” (42 USC § 9601 et seq.) process—will proceed in accordance with the signed *Final Comprehensive Record of Decision for Central Facilities Area Operable Unit 4-13* (DOE-ID 2000a). The Record of Decision (ROD) presents the selected remedies for 52 surface sites evaluated under the *Comprehensive Remedial Investigation/Feasibility Study for the Central Facilities Area Operable Unit 4-13 at the Idaho National Engineering and Environmental Laboratory* (DOE-ID 2000b). The ROD provides information to support remedial actions for three sites where contamination presents an unacceptable risk to human health and the environment.

The three sites requiring remedial action under the OU 4-13 ROD (DOE-ID 2000b) include:

- The CFA-04 pond
- The CFA-08 sewage plant drainfield
- The CFA-10 transformer yard.

The CFA-04 pond will be remediated to address the threat to human health and ecological receptors from mercury in soil. This work plan details the remedial action associated with the excavation and disposal of mercury-contaminated soil, excavation of asbestos-containing roofing materials, and general site cleanup, which includes removing miscellaneous construction debris and smoothing and contouring the surfaces at the CFA-04 pond.

The remedial action at the CFA-08 sewage plant drainfield began in May 2002 and was completed in 2002. The CFA-10 transformer yard remedial action began and was completed in 2001.

1.1 Work Plan Organization

This work plan outlines the major activities to be completed in implementing the remedial design for the CFA-04 site in accordance with the ROD (DOE-ID 2000a). The work plan describes the site, contaminants of concern, applicable or relevant and appropriate requirements (ARARs), project management, tasks, schedules, and cost estimates. The following are brief descriptions of the work plan’s sections and appendixes:

- Section 1 describes the background and history of WAG 4 and provides an overview of the selected remedy for the CFA-04 site.

- Section 2 provides the remedial design criteria, including the design codes and standards, assumptions, and quality assurance.
- Section 3 discusses the remedial design of the project. A summary of the required activities is presented.
- Section 4 is the evaluation of the CFA-04 site, including an evaluation of the potential risks to human health and the environment. Descriptions of existing site conditions, potential migration and exposure pathways, and an assessment of exposure routes are provided. In addition, the remedial action objectives (RAOs) and ARARs are discussed in this section.
- Section 5 outlines the CFA-04 pond remedial action work plan. This section includes the necessary steps and documentation required for completing the remedial action, as described in Sections 1 through 4. The required work tasks, project cost estimates, inspections, subcontractor requirements, inspections, and environmental and safety plans are discussed in this section.
- Section 6 describes the necessary actions involved for each 5-year review to occur after the remedial action has taken place.
- Section 7 is a listing of the references.
- Appendix A, “Design Drawings,” contains drawings that detail the present conditions (e.g., topography and fencing) at the site as well as the work to be performed during the remedial action.
- Appendix B, “Construction Specifications,” contains the technical specifications that provide the general terms and conditions required for completion of the remedial action.
- Appendix C, “Air Emissions Calculations” (Engineering Design File [EDF] -2442, “Exposure and Dose Calculations for Excavation of Mercury- and Radionuclide-Contaminated Soils at the CFA-04 Mercury Disposal Pond”), presents a summary of the results of the air emissions calculations to satisfy project ARARs.
- Appendix D, “Pre-Remediation Sampling Summary Report,” presents the results of the preremediation sampling conducted before the remedial action to better define the areal and vertical extent of contamination at the CFA-04 pond site. The soil excavation design is based on the results presented in this summary report.
- Appendix E, “Waste Management Plan,” describes the management and disposal of waste generated during remedial activities.
- Appendix F, “Cost Estimate for the CFA-04 Remedial Design/Remedial Action Work Plan,” provides the cost estimate, basis for the estimate, and related assumptions.
- Appendix G, “Environmental Checklist,” contains the environmental checklist.
- Appendix H, “Asbestos Sampling Data and Friability Determination,” contains an asbestos sampling data and friability determination.
- Appendix I, “Archeological and Historic Property Clearance,” contains the archaeological clearance recommendation.
- Appendix J, “Ordnance Survey Clearance,” contains the ordnance survey clearance.

- Appendix K, “Safety Category List and Safety Category Designation and Record,” contains the safety category list and the safety category designation and record.

In addition, five separate documents have been prepared for the CFA-04 pond RD/RA: (1) the *Health and Safety Plan for the CFA-04 Mercury Pond Sampling and Remedial Action* (INEEL 2002a) describes the possible hazards and the required actions to protect the health and safety of workers; (2) the “CFA-04 Mercury Pond Remedial Action Hazard Classification (Draft)”^a will evaluate the hazards associated with the CFA-04 pond remedial action work tasks and assign a hazard safety classification in accordance with established DOE criteria; (3) the *Field Sampling Plan for the Central Facilities Area-04 Pond Remedial Action* details the sampling and analysis activities for the CFA-04 pond remedial action (DOE-ID 2003a); (4) the *Re-evaluation of the Final Remediation Goals for Mercury at the CFA-04 (CFA-674 Pond)* (INEEL 2002b) presents and discusses the justification for raising the final remedial action goal from 0.5 mg/kg to 8.4 mg/kg; and (5) long-term operations and maintenance activities that will be conducted and institutional control requirements that will be implemented at WAG 4 sites are detailed in the *Operations and Maintenance Plan for the Final Selected Remedies and Institutional Controls at Central Facilities Area, Operable Unit 4-13* (DOE-ID 2002a). In the event that the site cannot be released for unlimited use as expected, then the Operations and Maintenance Plan may need to be updated after the remedial action.

1.2 Background

Located 51 km (32 mi) west of Idaho Falls, Idaho, the INEEL is a government-owned/contractor-operated facility managed by the U.S. Department of Energy Idaho Operations Office (DOE-ID) (Figure 1-1). Occupying 2,305 km² (890 mi²) of the northeastern portion of the Eastern Snake River Plain, the INEEL encompasses portions of five Idaho counties: (1) Butte, (2) Jefferson, (3) Bonneville, (4) Clark, and (5) Bingham.

Waste Area Group 4 is designated as one of 10 WAGs located at the INEEL and is comprised of the area known as the CFA. The CFA has been used since 1949 to house many of the support services for all of the operations at the site, including laboratories, security, fire protection, medical, communication systems, warehouses, cafeteria, vehicle and equipment pools, bus system, and laundry facilities. The original buildings at CFA—built in the 1940s and 1950s—housed Navy gunnery range personnel, administration, shops, and warehouse space. The facilities have been modified over the years to fit changing needs and now provide four major types of functional space: (1) crafts, (2) office, (3) service, and (4) laboratory.

1.2.1 The CFA-04 Pond

The CFA-04 pond is a shallow, unlined surface depression that was originally a borrow pit for construction activities at CFA (Figure 1-2). It is approximately 152 × 46 m (500 × 150 ft) and roughly 2 to 2.4 m (7 to 8 ft) deep; basalt outcrops are present within and immediately adjacent to the pond. It received laboratory waste from the Chemical Engineering Laboratory (CEL) in Building CFA-674 between 1953 and 1969. The CEL was used to conduct calcine experiments on simulated nuclear waste. (The calcining process later was used on actual nuclear waste at the INEEL to change the waste from a liquid to a solid and to effect an overall volume reduction.) The CEL experiments used mercury to dissolve simulated aluminum fuel cladding as well as radioactive tracers in the calcining process. The primary waste streams discharged to the pond from the CEL included approximately 76.5 m³ (100 yd³) of

a. HAD-211, 2003, “CFA-04 Mercury Pond Remedial Action Hazard Classification (Draft),” Rev. A, Environmental Restoration, February 2003.

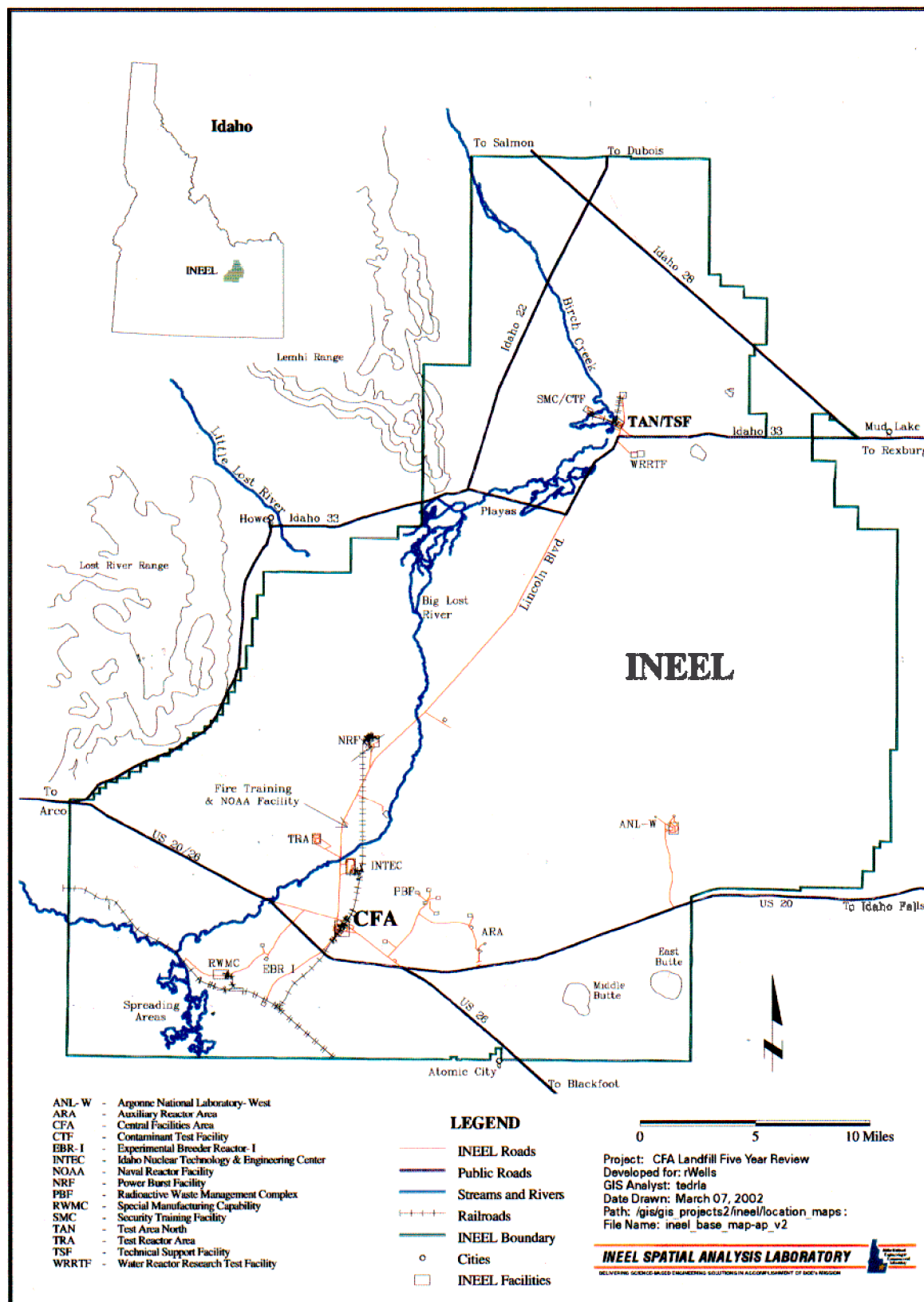


Figure 1-1. Idaho National Engineering and Environmental Laboratory.

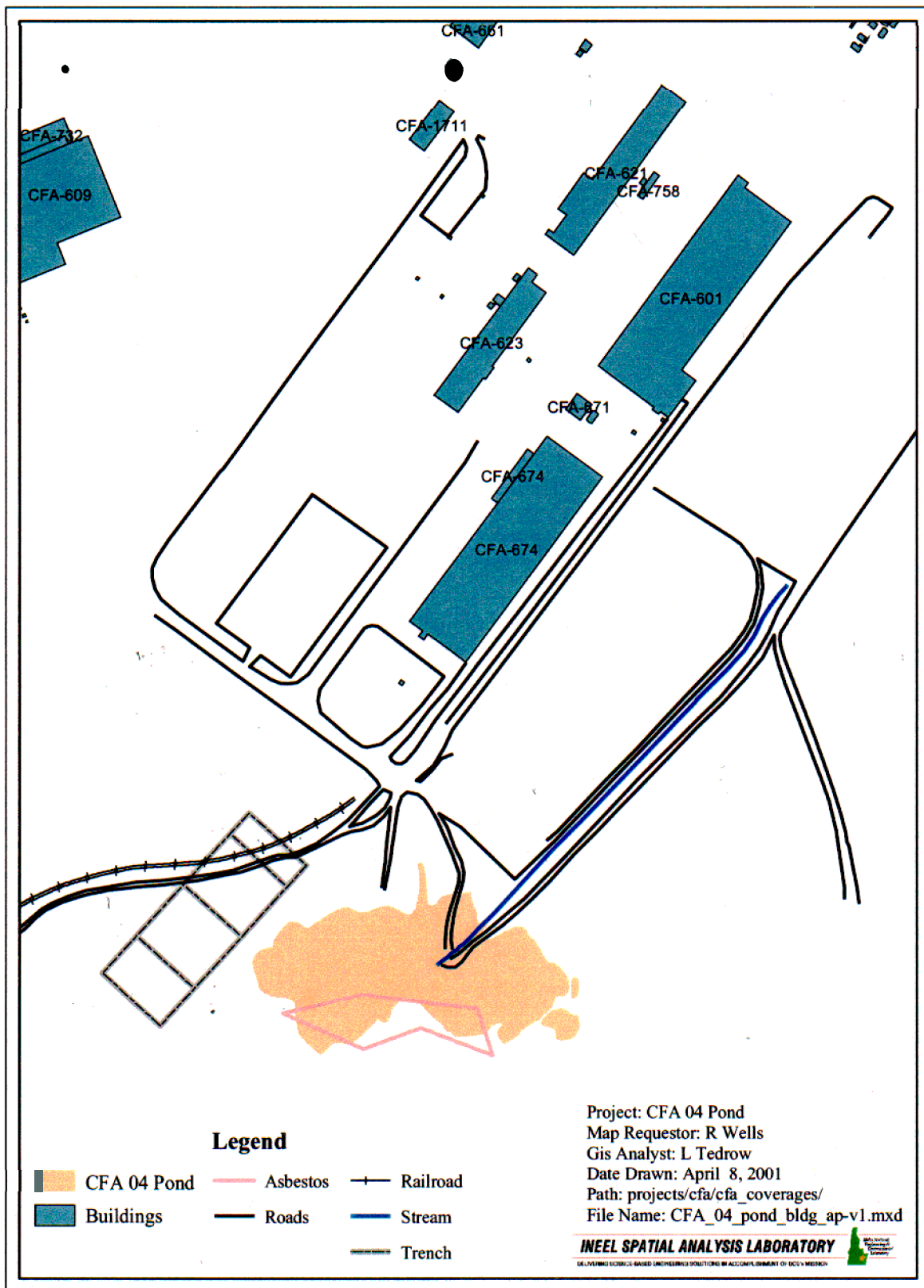


Figure 1-2. The CFA-04 pond and surrounding area.

mercury-contaminated calcine that contained low-level radioactive waste and liquid effluent from the laboratory experiments. In addition, there is approximately 382 m³ (500 yd³) of rubble, consisting of laboratory bottles, asphalt and asbestos-containing roofing materials, reinforced concrete, and construction and demolition debris. The pond also received run-off from the CFA site periodically between 1953 and 1995.

1.3 Selected Remedy

The Agencies have selected excavation, treatment by stabilization, and on-INEEL disposal for the CFA-04 pond mercury-contaminated soil, based on consideration of the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC § 9601 et seq.); the detailed analysis of alternatives; and public comments.

The selected remedy most cost effectively meets the threshold and balancing criteria of the three alternatives considered. The removal of the mercury-contaminated soil from CFA-04 will eliminate potential short-term and long-term human health and environmental threats. The INEEL CERCLA Disposal Facility (ICDF), or similar on-INEEL facility, will provide isolation of the contaminated soil and prevent adverse effects to human health and the environment. The following actions will be performed at the site in support of implementing the remedial design:

1. Characterizing the site and excavating soil from the CFA-04 pond that exceeds the mercury final remediation goal (FRG) of 8.4 mg/kg. Soil contaminated at concentrations above the FRG will be removed to 3 m (10 ft) or to basalt; no basalt will be excavated.
2. Packaging, transporting, and disposing of soil that exceeds the mercury FRG, but is less than the 0.2-mg/L toxicity characteristic leaching procedure (TCLP), in accordance with the *Idaho National Engineering and Environmental Laboratory Waste Acceptance Criteria* (DOE-ID 2002b) and the “Waste Acceptance Criteria for ICDF Landfill (Draft).”^b
3. Onsite stabilizing with grout and packaging, transporting, and disposing of soil that exceeds the mercury FRG and contains greater than or equal to 0.2 mg/L TCLP mercury, but is less than 260 mg/kg total mercury, in accordance with the Waste Acceptance Criteria for the ICDF (footnote b). Verification will be made that all land disposal restrictions (LDRs) are met.
4. Performing verification sampling to demonstrate that soil exceeding the FRG of 8.4 mg/kg total mercury has been removed.
5. Excavating, packaging, transporting, and disposing of asbestos-containing roofing material and commingled soil contaminated with mercury at concentrations above the FRG, but less than 0.2 mg/L TCLP mercury. The asbestos-containing material and commingled soil will be dispositioned in accordance with the INEEL Waste Acceptance Criteria (DOE-ID 2002b) and the Waste Acceptance Criteria for the ICDF (footnote b).
6. Backfilling the pond and adjacent areas that have been excavated with uncontaminated pit-run gravel and soil from the surrounding area. All excavations will be backfilled to preremedial action grade, contoured to reduce the steepness of the surrounding terrain, and revegetated.

b. DOE-ID, 2003, “Waste Acceptance Criteria for the ICDF Landfill (Draft),” DOE-ID-10856, Rev. A, U.S. Department of Energy Idaho Operations Office, Idaho Falls, Idaho, February 2003.

1.3.1 Waste Area Group 4 Institutional Controls

Institutional controls or land use restrictions will be maintained by DOE at any INEEL CERCLA site where residual contamination precludes unrestricted land use in accordance with EPA Region 10 policy (EPA 1999). Long-term institutional controls are planned for five CFA sites, which include the CFA-08 sewage plant drainfield; the CFA I, II, and III landfills (OU 4-12); and the CFA-07 French Drain.

Long-term institutional controls are not anticipated for the CFA-04 pond; however, they will be evaluated during and after the remedial action. If contamination representing an excess human health risk greater than $1E-04$ or an excess ecological risk greater than a hazard quotient of 10 is left in place, then institutional controls will be implemented at the site (DOE-ID 2000a).

2. DESIGN BASIS

2.1 General Description of Project Components

The project components (support facilities, electrical power, and project execution services) are described in the following subsections.

2.1.1 Support Facilities

The support facilities to be used during field operations include a field office trailer, parking area, equipment staging area, and material laydown areas. A field office trailer, portable toilet, and wash facilities will be established in the vicinity of the CFA-04 pond in an area that is upwind of the prevailing wind direction at the site.

2.1.2 Electrical Power

Electrical power is available near the CFA-04 site for use during the remedial action. A portable generator also may provide electrical power for the support facilities.

2.2 Design Criteria

2.2.1 Idaho National Engineering and Environmental Laboratory Management Control Procedures

The project definition, project planning, project execution, and project acceptance and closeout phases will be performed in compliance with pertinent Bechtel BWXT Idaho, LLC (BBWI) internal company procedures. The pertinent management control procedures (MCPs) for this project are those identifying requirements in the following areas:

- Engineering design
- Emergency preparedness and management
- Environmental management
- Fire protection
- Management systems
- Occupational safety and health
- Radiological protection
- Security
- Environmental restoration
- Waste management
- Conduct of operations

- Conduct of maintenance
- Quality.

2.2.2 The CFA-04 Pond Remedial Design Performance Standards

The criteria for the contaminated soil removal are based on the selected remedy, as defined in the ROD (DOE-ID 2000a). The soil removal will protect human health and the environment and will comply with the ARARs, as identified in Section 4 of this work plan. Although soil removal and disposal removes the contamination from the site, it does not reduce the toxicity or volume of waste through treatment, but will reduce contaminant mobility through stabilization. The selected remedy is the lowest cost of the three alternatives considered that meets the threshold criteria. The estimated period of time required to complete the remedial action at CFA-04 is 10 months.

Performance standards will be implemented during the remedial design to ensure that excavation, treatment, and disposal activities will result in protection of personnel and the environment against direct exposure to mercury. The performance standards identified for this alternative include:

- Removing mercury-contaminated soil where concentrations exceeding the FRG of 8.4 mg/kg are identified (DOE-ID 2003b).
- Using field screening measurements and soil sampling at the pond to verify that the remaining soil does not exceed the FRG.
- Sampling contaminated soil removed from the pond to confirm that the waste meets treatment standards for mercury and all underlying hazardous constituents, as identified in 40 CFR 268.48, "Universal Treatment Standards." In addition, it must also be verified that the waste meets the approved disposal facility's waste acceptance criteria. Soil meeting this standard must be less than 0.2 mg/L TCLP for mercury. Contaminated soil that does not meet treatment standards and requires treatment will be treated prior to disposal.

The following activities will be conducted to complete remediation of the CFA-04 pond:

- Removal of existing fencing (fabric, gates, and other reusable parts will be sent to excess)
- Removal of a temporary power pole and lines
- Excavation, stabilization (where required), packaging, transportation, and disposal of the low-level mercury and TCLP mercury-contaminated soil in accordance with the INEEL Waste Acceptance Criteria (DOE-ID 2002b) and the Waste Acceptance Criteria for the ICDF (footnote b)
- Excavation and disposal of asbestos-containing roofing material and other construction debris, including concrete, rebar, and gravel in accordance with the INEEL Waste Acceptance Criteria (DOE-ID 2002b) and the Waste Acceptance Criteria for the ICDF (footnote b)
- Backfilling and contouring of excavated areas to match surrounding terrain
- Revegetation of all areas affected by the project activities.

2.3 U.S. Department of Energy-Related Codes, Standards, and Documents

The following DOE-related codes, standards, and documents will be used as the basis for the remediation of CFA-04:

- *Final Comprehensive Record of Decision for Central Facilities Area Operable Unit 4-13* (DOE-ID 2000a)
- DOE Order 231.1, “Environment, Safety, and Health Reporting”
- DOE Order 232.1A, “Occurrence Reporting and Processing of Operations Information”
- DOE Order 414.1A, “Quality Assurance”
- DOE Order 435.1, “Radioactive Waste Management”
- DOE Order 440.1A, “Worker Protection Management for DOE Federal and Contractor Employees”
- DOE Order 470.1, “Safeguards and Security Program”
- DOE Order 5400.5, “Radiation Protection of the Public and the Environment”
- DOE Order 5480.4, “Environmental Protection, Safety, and Health Protection Standards”
- 10 CFR 830, “Quality Assurance Requirements”
- 10 CFR 835, “Occupational Radiation Protection.”

2.4 Engineering Standards

Appendix B contains references to the latest engineering standards and the specifications to which they apply.

2.5 Environmental and Safety

The following is a list of potential action-specific, chemical-specific, and location-specific ARARs identified in the ROD (DOE-ID 2000a). A detailed discussion of the ARARs is presented in Section 4.

The following are action-specific ARARs:

- 40 CFR 61.92, “Standard” (from 40 CFR 61, “National Emission Standards for Hazardous Air Pollutants”)
- 40 CFR 61.93, “Emission Monitoring and Test Procedures” (from 40 CFR 61, “National Emission Standards for Hazardous Air Pollutants”)
- 40 CFR 268.49, “Alternative LDR Treatment Standards for Contaminated Soil”

- IDAPA 58.01.01.585, “Toxic Air Pollutants Non-Carcinogenic Increments”
- IDAPA 58.01.01.586, “Toxic Air Pollutants Carcinogenic Increments”
- IDAPA 58.01.01.650, “Rules for the Control of Fugitive Dust”
- IDAPA 58.01.01.651, “General Rules”
- IDAPA 58.01.05.006, “Standards Applicable to Generators of Hazardous Waste”
- IDAPA 58.01.05.008 (40 CFR 264.553), “Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities”
- IDAPA 58.01.05.008 (40 CFR 264.554), “Staging Piles”
- IDAPA 58.01.05.011 (40 CFR 268), “Land Disposal Restrictions”
- 40 CFR 122.26, “Stormwater Discharge Requirements”
- 40 CFR 264.310(a)(1–5), “Closure and Post-Closure Care of Landfills”
- IDAPA 58.01.05.011 (40 CFR 268.49), “Alternative Treatment Standards for Contaminated Soil.”

The following are chemical-specific ARARs:

- IDAPA 58.01.05.005, “Identification and Listing of Hazardous Waste” (40 CFR 261.20 through 261.24).

The following are location-specific ARARs:

- 16 USC 470h-2, “Historic Properties Owned or Controlled by Federal Agencies”
- 36 CFR 800.4, “Identification of Historic Properties”
- 36 CFR 800.5, “Assessment of Adverse Effects”
- 25 USC 3002, “Ownership” (43 CFR 10.6)
- 25 USC 3005 (43 CFR 10.10), “Repatriation.”

2.6 Design Assumptions

The assumptions under which the RD/RA activities will be performed for the remediation of the CFA-04 pond are as follows:

- The ICDF will be operational and its waste acceptance criteria will allow it to accept and treat, as applicable, the majority of the mercury-contaminated waste.
- Control of infiltration and/or run-on at the CFA-04 site is not a requirement due to the absence of groundwater pathway risk drivers.

- Long-term institutional controls are not anticipated for the CFA-04 pond; however, if mercury concentrations exceeding the FRG are left in place representing a risk greater than 1E-04 or a hazard quotient greater than 10, institutional controls will be implemented unless otherwise documented in a 5-year review conducted by the Agencies.
- Preremediation sampling results (Appendix D) support estimated methyl mercury concentrations used in the reevaluation of the FRG, which was increased from 0.5 mg/kg to 8.4 mg/kg for total mercury.
- The Explanation of Significant Differences to the ROD (DOE-ID 2003b) will be approved by the Agencies. The Explanation of Significant Differences details the increase of the mercury FRG from 0.5 mg/kg to 8.4 mg/kg and eliminates the need to backfill the entire pond to the surrounding grade.

In addition to the assumptions listed in the *Central Facilities Area, Waste Area Group 4, Operable Unit 4-13 Remedial Design/Remedial Action Scope of Work (Final)* (DOE-ID 2000c), the following assumption also has been incorporated into the RD/RA of the CFA-04 pond. The ROD summarizes the Remedial Investigation/Feasibility Study (RI/FS) (DOE-ID 2000b) and baseline risk assessment completed for OU 4-13. The final remedial action goal, as identified in the OU 4-13 ROD (DOE-ID 2000a), is 0.5 mg/kg for mercury, which is 10 times the INEEL background value. Based on new toxicity and fate and transport information availability from the EPA (see INEEL 2002b), it was determined that a reevaluation of the FRG for mercury was appropriate for both human and ecological receptors. In addition, more realistic modeling for ecological receptors also was available, based on EPA information. A new FRG for mercury of 8.4 mg/kg is being proposed, based on this reevaluation of both the human health risk and ecological risk assessments. Using the updated approach and values, the reevaluation indicates that the amount of contamination requiring cleanup can be reduced while maintaining the same level of risk reduction to both human and ecological receptors. This reevaluation is presented in detail in the *Re-evaluation of the Final Remediation Goals for Mercury at the CFA-04 (CFA-674 Pond)* (INEEL 2002b).

2.7 Quality Assurance

A safety category has been assigned to the RD/RA of the CFA-04 pond in accordance with MCP-540, “Documenting the Safety Category of Structures, Systems, and Components.” A “Consumer Grade” safety category has been deemed appropriate for this project; as such, all design, procurement, and field operations activities will be performed in accordance with the “Consumer Grade” safety category designation. Appendix K contains the safety category list and safety category designation and record.

Plan (PLN) -694, “Project Management Plan—Environmental Restoration Program Management,” and the “Project Execution Plan for Waste Area Group 4” (PLN-808) have been adopted for this project and are incorporated herein by reference. The guidance governs the functional activities, organization, and quality assurance/quality control protocols that will be used for this project.

Where applicable, the project specifications (Appendix B) will specify the quality assurance/quality control procedures for the given task, consistent with the guidance provided by PLN-694, PLN-808, and the “Consumer Grade” safety category designation.

3. REMEDIAL DESIGN

3.1 Project Site

This section describes the remedial design for the CFA-04 pond, which was developed in accordance with the engineering design criteria presented in Section 2. The civil design drawings and specifications for the action are included in Appendixes A and B, respectively. The following sections summarize the major aspects critical to the remedial design.

3.2 The CFA-04 Pond Contaminant Summary

The CFA-04 pond was identified as a Track 2 investigation site in the FFA/CO (DOE-ID 1991). In 1994, visual inspections revealed the presence of calcine on the bermed areas around the periphery of the pond. Following surface and subsurface soil data collection from the calcine and the pond berm in early and mid-1994, a time-critical removal action in September 1994 excavated approximately 218 m³ (285 yd³) of calcine and calcine-contaminated soil and a small amount of asbestos-containing roofing material from the bermed area. The contaminated soil was remediated at a portable retort set up northeast of the pond. Verification soil sampling conducted after the removal action showed that the objectives of the removal action were met (INEEL 1998).

During the 1995 Track 2 investigation, soil samples were collected from the pond inlet area as well as a deeper area of the pond near the inlet where laboratory effluent might have collected. The results of the 1994 and 1995 soil investigations revealed that concentrations of the following constituents exceeded background concentrations for the INEEL: aluminum, arsenic, barium, cadmium, calcium, chromium, cobalt, lead, magnesium, mercury, nickel, Cs-137, Pa-234m, Sr-90, Th-234, U-234, U-235, and U-238. Aroclor-1254 also was detected at low levels.

In addition, soil samples were collected during 1997 and 1998 in support of the OU 4-13 RI/FS (DOE-ID 2000b) at four areas along the length of the pipe connecting the CEL to the pond, in the area northeast of the pond known as the windblown area, and from the pond bottom. Data from these investigations confirmed the presence of mercury in these areas at concentrations up to 439 mg/kg (DOE-ID 2000b). Four of the 88 samples exceeded the mercury Resource Conservation and Recovery Act (RCRA) characteristic hazardous waste level of 0.2 mg/L. Three of the four samples were in close proximity to one another in the pond, and the fourth was an isolated occurrence in the windblown area and was eliminated. A contour line was drawn around the three closely spaced samples and the area was estimated, as shown in the design drawings in Appendix A of this work plan. The depth of the potential RCRA characteristic soil in the pond conservatively was estimated to be 1.2 m (4 ft) in the pond bottom, indicating that approximately 542 m³ (709 yd³) of soil is potentially characteristic waste in accordance with RCRA and is subject to LDRs upon excavation.

The only contaminant at the CFA-04 pond that poses an unacceptable risk to human health and the environment is mercury. Mercury-contaminated soil is present in the pond bottom; around the pond periphery in the berms; at the outlet of the pipe connecting Building CFA-674 to the pond and in the area northeast of the pond, which is a result of windblown contamination, an area encompassing approximately 91 × 183 m (300 × 600 ft). The OU 4-13 RI/FS (DOE-ID 2000b) conservatively estimated the volume of mercury-contaminated soil to be approximately 6,338 m³ (8,290 yd³), based on the dimensions of the pond bottoms, windblown area, and pipeline at depths of 2.4 m (8 ft), 0.15 m (0.5 ft), and 1.8 m (6 ft), respectively. This volume was calculated using the extent of contamination based on the original FRG of 0.50 mg/kg for total mercury, as stated in the ROD (DOE-ID 2000a). In addition, there is non-friable asbestos-containing roofing material located along the southern portion of the pond and along

the south berm, as identified on the design drawings in Appendix A of this work plan. The soil in this area is contaminated with mercury above the FRG down to a depth of 1 m (3 ft).

The volume of contaminated soil requiring excavation has been reevaluated due to the results of the preremediation sampling conducted during the summer of 2002. Based on the results of the historical sampling (DOE-ID 2000b) and the preremediation sampling (Appendix D of this work plan), the volume of mercury-contaminated soil above the FRG is estimated at 8,101 m³ (10,597 yd³), including 1,725 m³ (2,256 yd³) of asbestos-containing material and commingled mercury-contaminated soil, 515 m³ (674 yd³) of potentially characteristic RCRA-regulated waste, and 119 m³ (156 yd³) of potentially contaminated soil and rubble in stockpiles. This is more soil than was estimated to be excavated in the ROD—6,338 m³ (8,290 yd³). Preremediation sampling results presented in Appendix D indicate that the soil around the asbestos-containing material is contaminated with mercury, whereas the asbestos-containing material was previously assumed to be uncontaminated.

3.3 Site Preparation

Plot plans delineating laydown, stockpile, and soil loading areas will be prepared before field activities commence. The following general site-preparation activities will be accomplished before soil excavation at CFA-04. Special requirements are stated as notes on the design drawings.

- One telephone pole and power wires will be removed.
- Chain link fencing and posts will be removed; the two-strand wire fence and t-posts will be removed in accordance with Specification 02200, “Earthwork” (provided in Appendix B).
- Scaffolding and a work platform will be constructed for sealing the plastic truck bed liners.
- The method for loading and packaging mercury-contaminated soil, asbestos-containing materials, and construction debris will be demonstrated with clean soil and approved by safety personnel, including the project industrial hygienist and project radiological engineer.
- Site access control and work control zones will be established.

3.4 Earthwork

Earthwork will include, but not be limited to, excavation, stockpile, backfill (not all areas will require backfill), and contouring. All earthwork activities will be conducted in accordance with Specification 02200, “Earthwork” (provided in Appendix B). Those areas disturbed by earthwork activities will be revegetated in accordance with the requirements set forth in Section 5.3.11 of this work plan. Standard dust-control measures (water spray, evaluation of work stoppage during winds exceeding 25 mph, soil fixatives, etc.) will be employed during all earthwork.

3.5 Surface Water and Erosion Protection

Contouring and grading of backfilled excavations (refer to Specification 02200, “Earthwork,” in Appendix B) will be performed to maintain existing surface-water flow patterns. Not all excavations will require backfilling; however, all areas will be revegetated or otherwise stabilized. Since the CFA-04 pond area is in a depression, contouring for drainage in the pond bottom will not be required; however, surrounding areas above the edge of the pond will be backfilled, as necessary, and contoured to promote

drainage. Revegetation will be conducted in a manner that mitigates the growth of noxious weeds (refer to Specification 02486, "Revegetation").

3.6 Task Site Staging

A laydown area will be necessary to stage equipment and materials close to the work site. The staging area will be located so that uncontaminated materials and equipment operate in work areas isolated from contaminated materials and equipment. A stockpile and truck loading area also will be required. The stockpile and loading area will allow contaminated soil to be stockpiled and also will allow the haul trucks to be loaded efficiently. Each truck will be lined with a soil sack, contaminated soil will be loaded into the trucks, and the soil sacks will be sealed before transport. A temporary decontamination area for personnel and equipment decontamination will be established at the control point in accordance with the decontamination requirements of the project Health and Safety Plan (INEEL 2002a). Spill prevention and control will be maintained for the staging area.

The staging area was selected based on several factors, including meteorological data, to ensure that the laydown and support areas would not be located downwind of the prevalent wind direction at the excavation and stockpiling sites. Among other considerations made in selecting the staging area were radiological control considerations, available infrastructure (i.e., power), and the site topography. The combination of these criteria forms the basis for selection of the staging areas.

4. HUMAN HEALTH AND ENVIRONMENTAL COMPLIANCE

4.1 Remedial Action Objectives

The RAOs for CFA-04, OU 4-13, were developed in accordance with the “National Oil and Hazardous Substances Pollution Contingency Plan” (40 CFR 300) and refined through discussions amongst the Agencies. The RAOs are based on the results of the human health and the ecological risk assessments, as outlined in the ROD (DOE-ID 2000a). During the development of the RAOs, it was assumed that the CFA would serve as the primary area at the INEEL for technical service and support functions until the year 2095, with access restrictions and other administrative and physical security controls. The intent of the RAOs is to set goals for the protection of human health and the environment.

The following RAOs were developed to protect human health and the environment for the contaminated soil sites:

- Prevent ingestion and inhalation of nonradionuclide contaminants of concern that would result in a total hazard index greater than 1.0
- Prevent exposure of ecological receptors to contaminated soil with concentrations that result in a hazard quotient greater than or equal to 10.

A remedial action goal for mercury was established for the CFA-04 pond site to meet the RAOs. The final remedial action goal for mercury at the CFA-04 pond site is 8.4 mg/kg, which was raised from the initial value of 0.5 mg/kg (10 times the INEEL background) as stated in the ROD (DOE-ID 2000a; INEEL 2002b).

As a result of new toxicity and fate and transport information from the EPA, it was determined that a reevaluation of the FRG for mercury was appropriate for both human and ecological receptors. Based on this reevaluation of both the human health risk and ecological risk assessments, a new FRG for mercury of 8.4 mg/kg has been selected. Using the updated approach and values, the reevaluation indicates that the amount of contaminated soil requiring cleanup may be reduced while maintaining the same level of risk reduction to both human and ecological receptors (INEEL 2002b). This is also documented in the *Explanation of Significant Differences to the Record of Decision for the Central Facilities Area, Operable Unit 4-13* (DOE-ID 2003b).

4.2 Applicable or Relevant and Appropriate Requirements

Table 4-1 summarizes how the substantive requirements of the ARARs and to be considered (TBC) requirements for the CFA-04 pond have been addressed by the remedial design or will be addressed during the remedial action. Use of air monitoring and/or dust-suppression techniques during earthwork activities will ensure compliance with emission ARARs. The site has been surveyed previously for cultural resources (Appendix I), and appropriate actions will be taken to satisfy ARARs for protection of sensitive resources. If cultural resources are encountered, the requirements delineated in the *Idaho National Engineering and Environmental Laboratory Cultural Resource Management Plan* (DOE-ID 2000d) will be involved. The DOE Order 5400.5 TBC will be met through administrative and engineering controls to limit exposures to ionizing radiation to allowable levels.

Table 4-1. Compliance with applicable or relevant and appropriate requirements and to be considered requirements for the CFA-04 pond remedial design/remedial action.

Category	Citation	Relevancy	Compliance Strategy
Action-Specific ARARs			
Rules for the Control of Air Pollution in Idaho			
Toxic air emissions (IDAPA 58.01.01.585 and .586)	The release of carcinogenic and non-carcinogenic contaminants into the air must be estimated before the start of construction, and controlled and monitored during excavation of soil.	A	The release of carcinogenic and non-carcinogenic contaminants into the air is addressed in Appendix C. The air emissions modeling indicates that contaminant levels will be well below regulated levels; as such, monitoring will not be required.
Fugitive dust (IDAPA 58.01.01.650 and .651)	The control of dust is required at all times, especially during disturbance and placement of existing vegetation and top soils.	A	Dust-suppression measures will be applied, where required, during the remedial action to minimize the generation of fugitive dust. These measures may include water sprays, commercial dust suppressants, tarps or covers, minimizing vehicle speeds, and evaluating work stoppage during periods of winds >25 mph.
NESHAP			
Radionuclide emissions from DOE facilities (40 CFR 61.92)	Limits exposure of radioactive contamination release to 10 mrem/year for the off-Site receptor.	A	Radionuclide emission calculations and air modeling have been completed for this site and are addressed in Appendix C. Results of the modeling estimated a 1.1×10^5 mrem dose at the site boundary. The calculated emissions will be included in the INEEL Annual NESHAP Report.
Emission monitoring (40 CFR 61.93)	Establishes monitoring and compliance requirements.	A	Air emissions have been modeled (see Appendix C). Modeled emissions are well below 10% of the minimum effective dose equivalent for point-source emissions monitoring.
Resource Conservation and Recovery Act—Standards Applicable to Generators of Hazardous Waste			
Hazardous waste determination (IDAPA 58.01.05.006)	A hazardous waste determination is required for all soil and secondary waste generated during remediation activities to ensure that proper treatment and/or disposal methods are applied.	A	Secondary waste generated during the remedial action will be evaluated through an HWD to ensure proper handling and disposal.

Table 4-1. (Continued)

Category	Citation	Relevancy	Compliance Strategy
Temporary units (IDAPA 58.01.05.008) (40 CFR 264.553)	A temporary tank or storage container may be used to treat or store hazardous remediation waste on the contiguous property for a period of no longer than 1 year.	A	Hazardous waste and/or soil containing hazardous waste will be generated during field activities in sufficient quantities that will require the use of temporary storage units. This waste will be required to be stored onsite pending the results of analytical testing. Requirements as stated in IDAPA 58.01.05.008 and 40 CFR 264.553 are applicable and will be met.
Remediation waste staging piles (IDAPA 58.01.05.008) (40 CFR 264.554)	The accumulation of solid, non-flowing remediation waste on the contiguous property must facilitate a reliable, effective, and protective remedy; be designed to prevent or minimize the release of hazardous waste; and must not operate for a period of longer than 2 years.	A	During remedial activities at the site, there is the potential to require the use of staging piles. Designation, construction, and operation of any such piles will be conducted in accordance with the presented requirements of IDAPA 58.01.05.008 and 40 CFR 264.544.
Storm water discharges during construction 40 CFR 122.26	A National Pollutant Discharge Elimination System permit must be obtained for the performance of construction activities to minimize, control, and monitor the discharge of storm water.	NA	The remedial action site lies outside of the boundaries of the storm water corridor at the INEEL; therein, compliance with these requirements is not applicable or relevant and appropriate.
Closure and post closure care of landfills 40 CFR 264.310(a)(1-5)	At completion, the cover must be designed and constructed to provide long-term minimization of migration of liquids, function with minimum maintenance, promote drainage and minimize erosion, accommodate settling, and possess a permeability less than or equal to natural sub-soils present.	NA	The identified areas of contamination will not contain hazardous waste in excess of established final remediation goals at the conclusion of field activities; therein, these requirements are not applicable or relevant and appropriate.
LDRs (IDAPA 58.01.05.011) (40 CFR 268)	All generated hazardous waste must be treated to meet specific concentration levels prior to land disposal.	A	Hazardous waste will be generated during the course of field activities that would trigger LDRs. All waste will be treated and disposed of in accordance with the requirements presented in IDAPA 58.01.05.011 and 40 CFR 268.
Alternative LDR treatment standards for contaminated soil (IDAPA 58.01.05.011) (40 CFR 268.49)	All generated soil containing hazardous waste must be treated to meet specific concentration levels prior to land disposal.	A	Soil containing hazardous waste will be generated during the course of field activities where alternative LDRs would be applicable. Where appropriate, soils will be treated and disposed of in accordance with the requirements presented in IDAPA 58.01.05.011 and 40 CFR 268.49.

Table 4-1. (Continued)

Category	Citation	Relevancy	Compliance Strategy
Chemical-Specific ARARs			
Identification and listing of hazardous waste			
Hazardous waste characteristics identification (IDAPA 58.01.05.005) (40 CFR 261.20–24)	Requires that solid waste not exempt from regulation as a hazardous waste must be evaluated to determine if it exhibits any of the characteristics of a hazardous waste.	A	Secondary waste generated during the construction of the engineering cap will be evaluated under an HWD to determine proper treatment, storage, and/or disposal paths identified.
Location-Specific ARARs			
National Historic Preservation Act			
Historic properties owned or controlled by federal agencies (16 USC 470h-2)	The site must be surveyed for cultural and archeological resources before construction commences, and appropriate actions must be taken to protect any sensitive resources.	A	A cultural and archeological resource investigation was performed. Summaries of the results of the investigation are provided in Appendix I. The results of the investigation show that there are no cultural or archeological resources within the site.
Identifying historic properties (36 CFR 800.4)	A review of existing information on historic properties within the area of potential affects including historic properties not yet identified must be performed.	A	A historical background investigation was performed. A summary of the results is provided in Appendix I. No properties of historical significance were identified to exist within the site.
Assessing effects (36 CFR 800.5)		A	A historical background investigation was performed. A summary of the results is provided in Appendix I. No properties of historical significance were identified to exist within the site.
Native American Graves Protection and Repatriation Act			
Ownership (25 USC 3002)	The site must be surveyed for cultural and archeological resources prior to construction and for appropriate actions taken to protect any sensitive resources.	A	A cultural and archeological resource investigation was performed. Summaries of the results of the investigation are provided in Appendix I. The results of the investigation show that there are no cultural or archeological resources within the site.
Repatriation (25 USC 3005) (43 CFR 10.10)	Any discovered human remains and/or associated or unassociated funerary objects must be repatriated within 90 days of receipt of request from a representative of lineal descent.	A	A cultural and archeological resource investigation was performed. Summaries of the results of the investigation are provided in Appendix I. The results of the investigation show that there are no cultural or archeological resources within the site.

Table 4-1. (Continued)

Category	Citation	Relevancy	Compliance Strategy
TBC guidance			
Radiation Protection of the Public and the Environment			
(DOE Order 5400.5, Chapter II [1][a,b])	Limits the effective dose to the public from exposure to radiation sources and airborne releases.	TBC	Requirement will be met by administrative and engineering controls during the disturbance of the existing vegetation and soil cover at the field site, excavation of contaminated soil, and by revegetating the area following removal activities. Job safety analyses and/or radiological work permits will be prepared for tasks where potential exposures to radioactive contamination/materials exist. Radiological work permits will only be used as determined by the radiological control technician, based on <i>Manual 15A-INEEL Radiological Control Manual</i> .
Relevancy: A = applicable R = relevant and appropriate TBC = To be considered is not classified as applicable or relevant and appropriate. NA = not applicable or relevant ARAR = applicable or relevant and appropriate requirement CFR = <i>Code of Federal Regulations</i> DOE = U.S. Department of Energy HWD = hazardous waste determination IDAPA = Idaho Administrative Procedures Act INEEL = Idaho National Engineering and Environmental Laboratory LDR = land disposal restriction NESHAP = National Emission Standards for Hazardous Air Pollutants			

5. REMEDIAL ACTION WORK PLAN

The work plan details the management approach to the remedial action, including schedule and the necessary steps and documentation to perform the remedial action and document its completion. This section describes the elements necessary to implement the remedial design outlined in Sections 1 through 4. Because the remedial design and the remedial action work plan are combined into one document, some details of implementation have been described in the design portion of this document for clarity.

5.1 Relevant Changes to the Scope of Work

There are no specific changes to the WAG 4, OU 4-13 SOW (DOE-ID 2000c), with the exception of the following:

- The CFA-04 pond area will not be backfilled to bring the area up to the existing grade surrounding the pond; however, the pond depression will remain, and the excavated areas will be backfilled using pit-run gravel and soil at the site to bring the excavated areas to preremedial action grade and contoured using the surrounding soil to reduce the steepness of the surrounding grade (DOE-ID 2002c).
- The cost estimate provided in the SOW (DOE-ID 2000c) will be modified based on the results of the ongoing preremediation field-sampling effort.
- The SOW (DOE-ID 2000c) references the FRGs listed in the OU 4-13 Record of Decision (DOE-ID 2000a); however, the FRG for mercury at the CFA-04 site was reevaluated and changed from 0.5 mg/kg to 8.4 mg/kg (INEEL 2002c; DOE-ID 2003b).

5.2 Assumptions and Unresolved Issues

Sections 2 and 3 of the SOW (DOE-ID 2000c) describe the assumptions and unresolved issues, respectively, associated with this project. Section 2.6 of this work plan describes the assumptions associated with the remedial design, and Section 2.7 presents the unresolved issues associated with the remedial action.

5.3 Work Tasks

For the purposes of this work plan, “contractor” refers to BBWI. “Subcontractor” means the business entity contracted to provide the materials, supplies, and/or services discussed herein. The following sections summarize the primary work tasks critical to the CFA-04 pond remedial action. These work tasks may be subcontracted in total, or in part, to a qualified subcontractor.

5.3.1 Premobilization

The subcontractor shall provide the contractor with all required submittals, work plans, bonds, and insurance. The subcontractor will verify that all remedial activity personnel working under contract for the subcontractor will be familiar with the relevant provisions of the project Health and Safety Plan (INEEL 2002a). The subcontractor will provide the contractor with documentation confirming that all project personnel working for or through the subcontractor have received the necessary training and completed the medical examination requirements. This requirement must be fulfilled before the subcontractor is allowed to mobilize. The submitted documentation will demonstrate/certify that the subcontractor can meet and satisfy the requirements of the work plan and the project design.

Prior to the start of construction activities, and in accordance with the environmental checklist provided in Appendix G, the spread of nuisance vegetation including cheatgrass and halogeton at the CFA-04 pond and surrounding areas will be mitigated. This will include the use of herbicide to control cheatgrass early in the spring of 2003 prior to the start of the remedial action at the CFA-04 pond, and herbicide application for halogeton control in the late summer of 2003 after the contaminated soil has been removed, but prior to the revegetation.

5.3.2 Mobilization

Mobilization refers to the work the subcontractor must perform in preparation for field operations. This work generally consists of the implementation of required administrative, engineering, and health and safety controls including, but not limited to, the following:

- Assembling the project work team and conducting a prejob briefing(s) specific to the remedial action tasks. (Specific elements of the prejob briefing will include identifying work to be performed, hazards associated with the tasks, and the steps taken to mitigate the hazards to enable safe completion of the work.)
- Delivering and storing the material and equipment.
- Setting up the field operations site offices (contractor and subcontractor).
- Identifying and demarcating the work areas, including installing temporary barriers and signs.

5.3.3 Fence and Pole Removal

The existing chain link fence shall be removed. The fabric and other recyclable fencing materials, including rails and braces, will be removed and sent to excess. The fence posts and concrete footings will be removed and sent to the CFA landfill for disposal.

The two-strand wire fence, t-posts, and corner posts also will be removed. The wire strands will be sent to the CFA landfill for disposal. If the t-posts and/or corner posts are located inside an area with mercury contamination exceeding the remedial action goal, they will be decontaminated to the extent practical. If all contamination is removed, the posts will be sent to excess; however, if complete decontamination is not practical or they cannot be excessed, then the posts and other potentially mercury-contaminated debris will be disposed of at the CFA landfill or, if radiologically contaminated, they will be disposed of at the ICDF.

A single power pole located within the bounds of the proposed controlled work area also will require removal. The power pole and lines to the pole will be removed prior to the excavation of mercury-contaminated soil. The pole will be removed intact and surveyed for radiological contamination, and it will be sampled for mercury contamination and disposed of at the CFA landfill or ICDF, as applicable.

5.3.4 Mowing and Clearing the Site

Although the vegetation is sparsely located throughout the pond, clearing of vegetation may be required to mitigate the potential fire hazard during task site operations. Mowing operations will be limited to the areas designated on the design drawings, those areas required for barrier construction, or as directed by INEEL project personnel. Any areas outside the designated areas that are damaged or disturbed by field operations will be repaired and reseeded by the subcontractor in accordance with Specification 02486, "Revegetation" (provided in Appendix B of this work plan).

5.3.5 Earthwork

Earthwork associated with this project includes, but is not limited to, the following:

- Mowing and clearing vegetation, as required
- Controlling dust
- Excavating contaminated soil
- Backfilling and contouring, as required
- Finish grading and grading for surface drainage.

The earthwork will include the excavation of low-level mercury-contaminated soil and asbestos-containing roofing material and other construction debris and the backfilling, contouring, and finish grading of the excavated areas. All earthwork will be performed in accordance with Specification 02200, "Earthwork" (provided in Appendix B), and the project design drawings provided in Appendix A of this work plan.

5.3.6 Asbestos-Containing Material Removal

The asbestos-containing material located along the southern portion of the pond and along the south pond berm (Zone 11) encompasses an area of approximately 1,834 m² (19,740 ft²). The estimated volume of material (i.e., asbestos-containing material and commingled soil) requiring removal and disposal is 2,044 m³ (2,673 yd³). Based on the results of the preresmediation sampling, the commingled soil is contaminated with mercury at concentrations in excess of the FRG to a depth of 1 m (3 ft), as presented in Appendix D. As such, the initial removal of soil in this area will be down to a depth of 1 m (3 ft), followed by visual inspection for additional asbestos-containing material. If additional asbestos-containing material is identified, it will be excavated, removed, and disposed of in accordance with the INEEL Waste Acceptance Criteria (DOE-ID 2002b). The INEEL Waste Acceptance Criteria document (DOE-ID 2002b) contains waste characterization requirements, requirements for transferring or dispositioning property or material owned by the DOE at the INEEL, waste acceptance criteria for the various facilities at the INEEL, and packaging and labeling requirements for waste. Excavation will occur until visual inspections verify that no asbestos-containing material remains in the area.

The asbestos-containing material at the CFA-04 pond area has been determined to be non-friable, as indicated in Appendix H of this work plan; however, the use of heavy equipment to excavate the asbestos-containing material has the potential to make the asbestos-containing material friable during removal. As such, generally accepted industrial practices will be implemented during the asbestos-containing material removal, and the site safety representative will monitor the asbestos-containing material removal closely. The method of compliance will be pursuant to the 29 CFR 1926.1101, "Asbestos," standard and in accordance with Program Description Document (PDD) -1038, "Asbestos Training Program," and MCP-2862, "Asbestos Management Program Administration," as detailed in Specification 02200, "Earthwork."

The asbestos-containing material excavation practices are anticipated to include the use of heavy equipment (i.e., backhoe and front-end loader) and hand tools such as shovels and buckets. As detailed in Appendix B, the area to be excavated will be thoroughly wet-down 24 hours before excavation. In addition, water spray will be used during excavation to mitigate the dust hazard. The excavation of asbestos-containing material will be monitored and evaluated by contractor and subcontractor safety personnel.

Although it has been determined that the asbestos-containing material on the pond surface is non-friable, the potential exists to encounter non-roofing asbestos-containing material. If non-roofing asbestos-containing material is encountered during the removal, operations will cease in the immediate area, and appropriate controls (i.e., switch to hand removal of the asbestos-containing material while wearing personal protective equipment) will be implemented.

Asbestos-containing material and commingled soil removed from the site might contain some calcine; however, incidental calcine will not be significant enough to classify the asbestos-containing material as a hazardous waste (TCLP greater than 0.2 mg/L), as indicated by an assessment performed in 1994 to evaluate the potential for mercury-contaminated asbestos-containing material to be classified as hazardous waste. Three samples of asbestos-containing material were collected and analyzed for TCLP mercury, with all results being non-detect (INEEL 1998). Also, none of the recent preresmediation samples exceed the TCLP for mercury (see Appendix D). As such, the asbestos-containing material is not considered RCRA characteristic hazardous waste. Radiological surveys of the excavated asbestos-containing material will be conducted to verify the absence of radioactive material.

5.3.7 Mercury-Contaminated Soil Excavation

Excavation of mercury-contaminated soil above the 8.4-mg/kg FRG will be completed in accordance with the design drawings and specifications provided in Appendixes A and B, respectively. Zone 2A will be further defined as discussed in the Field Sampling Plan before excavation begins, which may result in its dimensions being changed. Additional windblown calcine was recently visually discovered outside of Zone 2 and was confirmed by analysis of a grab sample with the mercury field analyzer.

For the purposes of waste disposition, four categories of mercury-contaminated soil will be excavated. (Volume estimates are in-place volumes, based on preresmediation sampling conducted in the summer of 2002) The low-level mercury-contaminated soil volume could increase and the mercury-contaminated soil volume could decrease, depending on the results of pending radionuclide analyses from previous preresmediation sampling and radionuclide analyses of the calcine. Although some of the waste soil and calcine is not suspected of containing radionuclides, it needs to be analyzed to confirm that it is not radioactive before it can be treated and/or disposed of. The four categories are as follows:

1. Low-Level Mercury-Contaminated Soil—Soil with total mercury concentrations above 8.4 mg/kg and TCLP mercury concentrations less than 0.2 mg/L, and radionuclide concentrations exceeding the INEEL Waste Acceptance Criteria (DOE-ID 2002b). Radioactive tracers (Cs-137, Sr-90, Ru-106, and unidentified uranium isotopes) were used in the calcine tests (INEEL 1998); therefore, the excavated soil may be considered low-level radioactive in addition to its mercury component (approximately 3,091 m³ [4,043 yd³] from Zones 5, 6, 7, and 8).
2. Mercury-Contaminated Soil—Soil with total mercury concentrations above 8.4 mg/kg and TCLP mercury concentrations less than 0.2 mg/L (approximately 4,495 m³ [5,880 yd³]). This includes the mercury-contaminated asbestos-containing material from Zone 11 and mercury-contaminated soil from Zones 2, 2A, 12, 13, and 14.
3. Low-Level, TCLP Mercury-Contaminated Soil—Soil with total mercury concentrations between 8.4 and 260 mg/kg (8.4 mg/kg ≤ soil concentration <260 mg/kg), TCLP concentrations greater than or equal to 0.2 mg/L, and radionuclide concentrations exceeding the INEEL Waste Acceptance Criteria (DOE-ID 2002b) (approximately 515 m³ [674 yd³] from Zones 6A and 7A) of mercury-contaminated soil will be included in this waste stream because of its potential to exceed the TCLP based on 1994 sampling; however, the soil did not exceed the TCLP in preresmediation sampling.

4. TCLP Mercury-Contaminated Calcine—Calcine beads with total mercury concentrations greater than 260 mg/kg and TCLP concentrations greater than or equal to 0.2 mg/L (quantity unknown).

The mercury-contaminated soil will be excavated following the excavation plans shown on the design drawings in Appendix A and in accordance with Specification 02200, “Earthwork” (provided in Appendix B). The mercury-contaminated soil will be excavated first and hauled to the CFA landfill for disposal. The soil from the three suspected calcine bottle sites will be pulled onto the adjacent contaminated zones. Any calcine-filled bottles that exceed 260 mg/kg mercury and 0.2 mg/L TCLP mercury will be packaged and shipped off-Site for treatment and disposal. Otherwise, they will be treated/disposed of at the CFA landfill or the ICDF as appropriate for their waste characteristics. Then, the low-level TCLP mercury-contaminated soil will be excavated and hauled to the ICDF for storage in a pile until it can be stabilized and disposed of. Finally, the low-level mercury-contaminated soil that is on top of the basalt will be excavated and hauled to the ICDF for disposal.

Where contaminated soil extends to the soil/basalt interface, the contaminated soil will be removed, to the extent practical, from the basalt interface and in the basalt cracks/crevices using methods that include sweeping with brooms and/or vacuuming.

5.3.8 Soil Hauling and Disposal

All excavated materials including the asbestos-containing material and mercury-contaminated soil will be loaded into end-dump trucks or similar approved equipment. The asbestos-containing material, associated construction debris, and associated mercury-contaminated soil will be hauled to the CFA landfill. The low-level mercury-contaminated soil and TCLP mercury-contaminated soil will be hauled and disposed of at the ICDF (see footnote b) and the INEEL Waste Acceptance Criteria (DOE-ID 2002b). The low-level, TCLP high mercury-contaminated soil will be packaged and shipped to meet the treatment facility’s waste acceptance criteria and in accordance with U.S. Department of Transportation regulations.

The beds of the end-dumps will be lined with plastic bags (burrito bags) prior to loading and hauling the excavated low-level TCLP material that will be disposed of at the ICDF to prevent contamination of the truck beds and minimize the amount of decontamination waste that will be generated. After placement of the soil in the truck beds, the burrito bags will be folded over the top of the load and sealed for transport to the ICDF.

5.3.9 Dust Suppression

Dust generation will be minimized during earthwork activities in accordance with Idaho Administrative Procedures Act (IDAPA) standards. This may be accomplished by using water trucks or covering the trucks used to haul borrow material. The amount of water used will be limited to prevent the creation of flowing water or overly moist loam fill material. Water-based dust-control additives may be used with the approval of the project manager.

5.3.10 Final Verification Sampling

Soil removal at the CFA-04 pond site will be directed primarily based on the results of the preremediation sampling. Some additional preremediation sampling will be done in accordance with the Field Sampling Plan (DOE-ID 2003a) and also will be used to direct excavation. The initial excavations will be designed to meet the RAOs, as specified in Section 4.1, by removing contaminated soil with mercury concentrations above the 8.4-mg/kg FRG. Upon excavation, field screening for residual mercury contamination will be conducted. If the field screening shows mercury concentrations above the FRG, then an additional 15.2 cm (6 in.) of soil will be excavated from the designated area, followed by

additional field screening samples. This iterative process will continue until field screening shows that the residual mercury concentrations for the underlying soil are below the 8.4-mg/kg FRG. Once the FRG for a given area of excavation has been achieved (as indicated by field screening methods), then final verification sampling and laboratory analysis will commence in accordance with the Field Sampling Plan (DOE-ID 2003a).

5.3.11 Site Reclamation and Stabilization

Upon completion of soil excavation and verification, and prior to reseeded, disturbed areas will be graded and/or backfilled to prerediation grade with uncontaminated pit-run gravel and soil. The surrounding soil will be used to decrease the steepness of the grade and will provide a smooth transition from the higher surrounding grade.

Upon completion of soil excavation, reclamation seeding will take place at all disturbed areas associated with the remediation of the CFA-04 pond. In addition, the CFA-674 trenches and other areas adjacent to the cap will be reseeded. The seeding, fertilizing, and mulching of these sites will be performed following *Guidelines for Revegetation of Disturbed Sites at the Idaho National Engineering Laboratory* (DOE-ID 1989) in accordance with the requirements set forth in Specification 02486, “Revegetation,” provided in Appendix B of this document.

5.3.12 Demobilization

After the remedial action activities have been satisfactorily completed, and all equipment has been properly decontaminated, task site personnel will demobilize from the site and the equipment will be removed from the site. Decontamination pads and temporary barriers and signs will be removed and dispositioned appropriately.

5.4 Field Oversight/Construction Management

The DOE-ID remediation project manager will be responsible for notifying the EPA and IDEQ of project activities such as project startup, closeout, and inspections. Activities related to preliminary, prefinal, and final inspections are covered in Section 5.7. In accordance with the FFA/CO (DOE-ID 1991), notification will be provided to the EPA and IDEQ WAG managers a minimum of 14 calendar days prior to prefinal inspection activities.

The project manager also will serve as the single interface point for all routine contact between the Agencies and INEEL contractor representatives. In addition, BBWI will provide field support services for field oversight, health and safety, environmental, quality assurance, and landlord services for this project. An organization chart (Figure 9-1) and position description subsections are provided in the project Health and Safety Plan (INEEL 2002a).

Visitors to the project site who wish to observe the remedial activities must meet badging and training requirements necessary to enter INEEL facilities. Training requirements for task site visitors are described in the project Health and Safety Plan (INEEL 2002a).

5.5 Project Cost Estimate

The project cost estimates for the tasks addressed by this work plan are presented in Appendix F—the cost estimate for preparation of the remedial action report also is included—and the total project cost estimate is summarized in Table 5-1. The costs may be revised during subsequent submittals of this document to reflect the most current estimate, based on comments to the design and other data.

5.6 Project Schedule

The schedule and schedule data for the CFA-04 pond RD/RA are presented in Figure 5-1. The schedule details all CFA-04 tasks identified in the OU 4-13 SOW (DOE-ID 2000c) through completion of the remedial action report. The draft remedial action report will be submitted to the Agencies for review by March 1, 2004. Administrative document preparation activities are based on an 8-hour day, 5-day workweek, while field activities are based on a 10-hour day, 4-day workweek. The schedule does not include any contingency for delay to the schedule because of late or slow document reviews or for field activities experiencing loss of productivity due to adverse weather conditions or other causes outside of the project team's control.

Table 5-1. The CFA-04 pond remedial action cost estimate.

	ROD Cost Element (\$K)	Updated Cost Element (\$K)
Remedial Action	1,736 ^a	1,095 ^b
a. Cost estimates from the ROD include 30% contingency and a factor of 1.0727 to convert from FY 1999 to FY 2001 dollars.		
b. Values rounded are from the RD/RA cost estimate in Appendix G.		
FY = fiscal year		
RD/RA = remedial design/remedial action		
ROD = Record of Decision		

5.7 Inspections

Upon completion of remedial action construction activities, standard prefinal and final inspections will be performed at the CFA-04 site at the discretion of the project managers or designees. Approval for backfilling in the exposed clean basalt areas is required by the Agencies. This may occur as part of the prefinal inspection. Periodic inspections can occur at any time during remedial activities. The inspections will be conducted to finalize all project work elements. The inspections will establish compliance with the remedial design, the activities outlined in the remedial action work plan, and with all project requirements.

5.7.1 Prefinal Inspection

The Agency project managers or their designees will conduct the prefinal inspection before completion of excavation. The DOE-ID will develop a prefinal inspection checklist prior to inspection that is reviewed and concurred with by the EPA and IDEQ. The inspection checklist may include site preparation activities before digging and may include operational checks during the course of excavation. The Agencies will agree on a prefinal inspection date. The prefinal inspection will determine the status of remediation activities, including outstanding requirements and actions necessary to resolve any issues identified. All of the outstanding requirements, along with the actions required to resolve them, will be identified and approved by the Agencies during the prefinal inspection. The prefinal inspection report will document any unresolved items and the actions required for resolution.

5.7.2 Prefinal Inspection Report

Documentation of the prefinal inspection will be provided in a prefinal inspection report, which will contain the following elements:

- The names of all inspection participants

- Inspection checklist(s) containing specific project components requiring inspection to constitute acceptance of the remedial action
- A discussion of all documented inspection findings
- Corrective actions to be taken to correct deficiencies identified in the inspections, including the required corrective action, acceptance criteria or standards, and planned dates for completion of the actions
- A date for the final inspection.

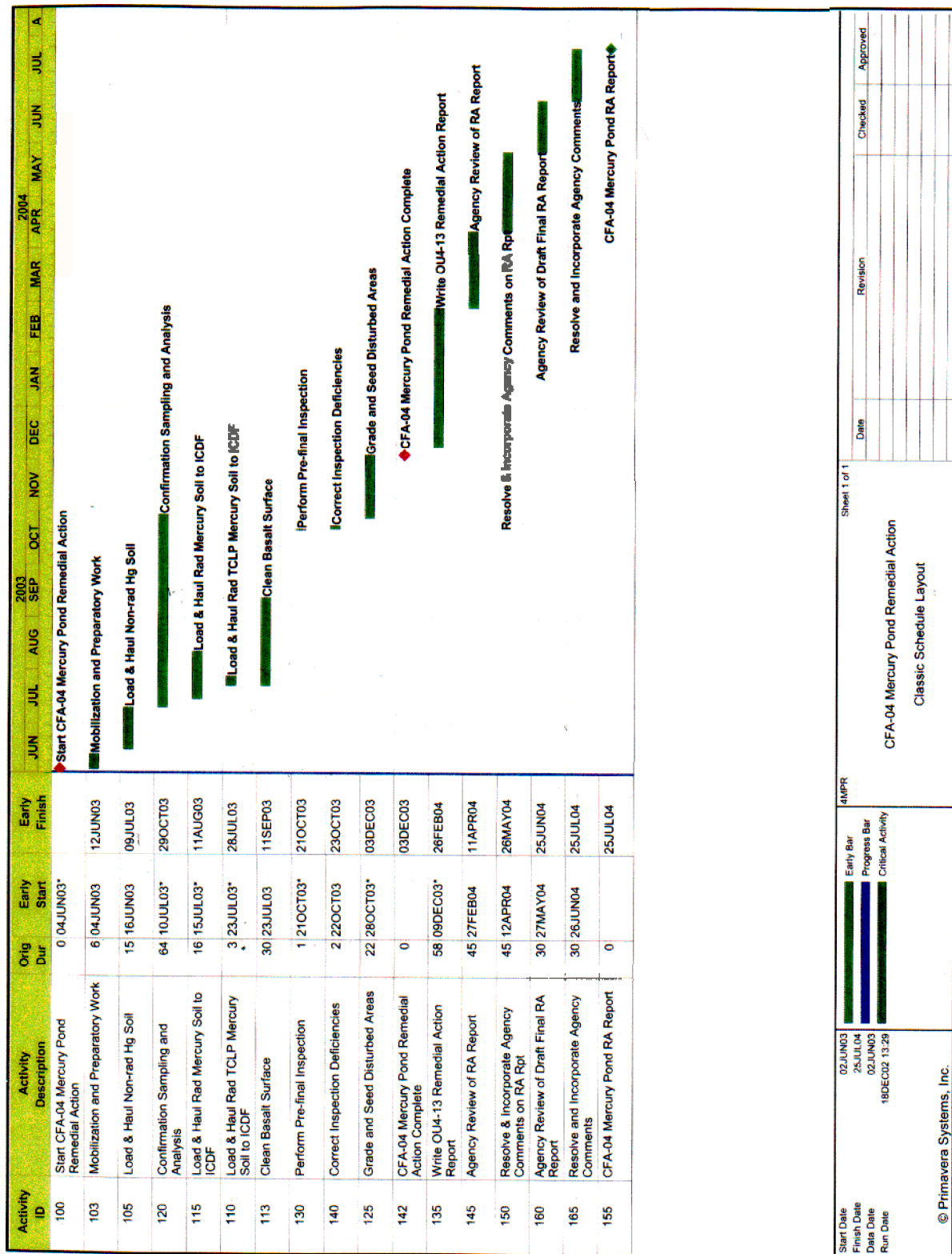


Figure 5-1. The CFA-04 pond remedial action project schedule.

This report will be issued to indicate how the objectives of the OU 4-13 ROD (DOE-ID 2000a) are being met. The prefinal inspection report will not be revised/finalized; however, the inspection will be finalized in the context of the remedial action report, documenting the prefinal inspection process in accordance with Section 2.13 of the Action Plan in the FFA/CO (DOE-ID 1991). Submittal of the prefinal inspection report and the respective targeted schedule is identified in Section 5.6.

5.7.3 Final Inspection

The final inspection will be conducted following demobilization, after all excess materials and nonessential construction equipment have been removed from the site and the site is considered functional and operational. Some equipment may remain onsite to correct items identified during final inspections. Final inspections, as conducted by the Agencies' project managers or their designees, will confirm the resolution of all outstanding items identified in the prefinal inspection and verify that the CFA-04 pond remedial action has been completed in accordance with the requirements of the OU 4-13 ROD (DOE-ID 2000a). Final inspections will be documented in the final remedial action report.

5.8 Subcontracting Plan

The work comprising the remedial action of the CFA-04 pond is primarily earthwork, including the excavation, stockpiling, treatment, and loading and hauling of contaminated soil. Other activities included in this project are the removal of a power pole, fencing, and site reclamation activities. The specific tasks that will be performed to complete this work are described in Section 3.

The work, in total or in part, may be competitively bid to the lowest qualified bidder, and a firm fixed-price contract will be awarded. The bid process will include the Request for Proposal, pre-bid conference, private or public bid opening, bid evaluation, notice of award, notice to proceed, and the preconstruction conference. The Request for Proposal will specify, among other things, a strict period for performance that will correspond with the overall project schedule.

5.9 Quality Control Inspection Plan

A quality control inspection plan has been prepared for this project. The tasks comprising this project may be subcontracted, in whole or in part, to a qualified subcontractor. The work performed by the subcontractor will be subject to periodic inspections by the contractor. The purpose and frequency of the inspections are detailed in the remedial design specifications in Appendix B.

5.10 Health and Safety Plan

A site-specific Health and Safety Plan (INEEL 2002a) has been prepared specifically for the tasks and conditions to be encountered on this project. This document is a living document and may be updated as conditions dictate. The plan covers the following items:

- Hazard identification and mitigation
- Exposure monitoring and sampling
- Accident and exposure prevention
- Personal protective equipment

- Personnel training
- Site control and security
- Occupational medical surveillance
- Task site responsibilities
- Emergency response plan for the task site
- Decontamination procedures
- Record-keeping requirements.

5.11 Waste Minimization Plan

Waste will be generated as a result of the activities conducted during this project. The types of waste expected to be generated include the following:

- Low-level mercury-contaminated soil (both non-hazardous and hazardous)
- Asbestos-containing material with commingled mercury-contaminated soil
- Miscellaneous construction debris (reinforced concrete, rebar, etc.)
- Personal protective equipment
- Equipment decontamination liquid residue
- Equipment decontamination solid residue
- Plastic sheeting
- Fencing materials (metal posts, wire, etc.)
- Wooden telephone pole
- Hydraulic spills
- Miscellaneous waste.

Some waste may be low-level radioactive; in addition, a portion of the CFA-04 pond contains RCRA characteristic hazardous waste and will carry the D009 code for mercury. As the remediation commences, additional waste streams may be identified. All new waste streams projected, as well as those identified above, are required to have the waste identified and characterized. A hazardous waste determination (HWD) must be completed and presented to the appropriate waste management organization (e.g., Waste Generator Services) for approval at the time of generation. A complete description of the waste being generated and the appropriate disposition route is provided in Appendix E, "Waste Management."

5.12 Storm Water Pollution Prevention Plan

Work activities at the CFA-04 pond lie outside of the corridor of the Big Lost River System, and as such, a Storm Water Pollution Prevention Plan (SWPPP) is not necessary for the soil removal activities. If borrow material is required, the use of borrow material from on-INEEL sources could require an SWPPP. Addendum I to the *INEEL Storm Water Pollution Prevention Plan for Industrial Activities* (DOE-ID 2000e) addresses the SWPPP requirements for the use of established borrow sources.

5.13 Work within a Floodplain

The CFA-04 pond lies in an area where the surrounding ground elevation is approximately 1,503 m (4,932 ft) above sea level. This elevation is below the 1,506-m (4,941-ft) peak water surface elevation indicated for the Mackay Dam piping failure during a 100-year flood, as described in the report *Flood Routing Analysis for a Failure of Mackay Dam* (Koslow and Van Haaften 1986). Thus, for purposes of “National Environmental Policy Act” (42 USC § 4321 et seq.) compliance, the CFA-04 pond is within the 100-year floodplain. The impacts from these activities with respect to a 100-year flood event are minimal due to the nature of the remedial action (i.e., removal and disposal). The removal of contaminated material from the site improves the area and decreases the deleterious effects and potential environmental transport of the contamination due to a 100-year flood.

5.14 Decontamination Plan

Equipment decontamination will be conducted when deemed necessary by field personnel. Decontamination operations will be performed as outlined in the project Health and Safety Plan (INEEL 2002a) and in accordance with Technical Procedure (TPR) -6574, “Decontaminating Heavy Equipment in the Field,” and TPR-6575, “Decontaminating Sampling Equipment in the Field,” as appropriate. As an exception to the decontamination procedures, isopropanol will not be used during decontamination since organic contamination is not a concern.

Radiological, RCRA characteristic hazardous mercury, and asbestos are the potential contamination issues anticipated at the CFA-04 pond remedial action site. In the event equipment becomes contaminated, dry decontamination procedures will be used (except in the event of asbestos decontamination) at the beginning of the decontamination effort. If dry decontamination methods are not successful, or in the event of asbestos decontamination, then the equipment will be moved onto a clean decontamination pad or plastic where it will be decontaminated using a high-pressure, low-volume water spray from a portable unit. Decontamination of equipment for asbestos will require wet methods only, including the use of low-volume, low-pressure water. The rinsate will be collected and filtered. All equipment will be surveyed for radioactivity and visually inspected for asbestos-containing material and mercury-contaminated soil to verify that all contamination has been removed. If additional contamination is still evident, further decontamination efforts will be conducted until the equipment is clean and may be free released. The equipment will remain in the area where remediation is being conducted until it is adequately decontaminated, as verified by a field radiation survey performed by the radiological control technician and by visual examination conducted by the site safety representative or designated alternate. The following equipment may be used for decontamination:

- Decontamination pads or plastic sheeting large enough to accommodate any equipment used in the contaminated area.
- Brooms, wire brushes, putty knives, and other small equipment for removing contamination through dry methods.

- Portable, low-volume, low-pressure water spray units. (This equipment would only be used if dry decontamination were ineffective.)

Management of waste generated during decontamination efforts will remain within the area of contamination for temporary storage until final waste disposition. Similarly, tools used for decontamination (brushes, putty knives, etc.) will be decontaminated, surveyed for contamination, and released for reuse.

5.15 Spill Prevention/Response Plan

In the event of a spill, the emergency response plan (see Section 11 of the project Health and Safety Plan [INEEL 2002a]) will be activated. All materials/substances on the work site will be stored in approved containers in accordance with the applicable regulations.

5.16 Operations and Maintenance Plan

The Operations and Maintenance Plan (DOE-ID 2002a) describes the long-term operations and maintenance activities that will be conducted at WAG 4, OU 4-13 to ensure the selected remedies identified in the ROD (DOE-ID 2000a) remain protective of human health and the environment. The plan outlines the environmental monitoring requirements for WAG 4. The plan is a living document that will be revised, as necessary, with Agency concurrence to incorporate changes and additions identified during the implementation of the plan.

The institutional control plan is included as an appendix to the Operations and Maintenance Plan (DOE-ID 2002a) and outlines the institutional control requirements for WAG 4. The plan describes those items that will be included in the annual inspections. Institutional controls are not planned for the CFA-04 site; however, if it is necessary to leave contamination in place, the residual risk will be evaluated and institutional controls will be implemented, as necessary.

5.17 Remedial Action Report

The remedial action report will be prepared following demobilization and restoration of the disturbed areas at the CFA-04 site and will be submitted to the Agencies as a secondary document. The remedial action report will be comprehensive for OU 4-13 and will include the remedial action at CFA-04 and the construction complete reports of the remedial actions completed at the CFA-08 sewage plant drainfield and the CFA-10 transformer yard. Details of the three OU 4-13 remedial actions will include, but not be limited to, the following:

- Identification of the work defined in the work plans and certification that the work was performed.
- Explanation of any modifications to the work plans.
- Explanation of any modifications to the remedial designs during the remedial action phase, including the basis and results of the modifications.
- Problems encountered during the remedial actions and resolutions to these problems.
- Any outstanding items from prefinal inspection reports that were identified and described.

- Certification that the remedies are operational and functional. (The DOE-ID will provide a statement certifying that the remedies are achieving, or have achieved, the requirements of the ROD [DOE-ID 2000a].)
- As-built drawings showing final contours at each of the three remediated sites.
- Final, total costs of the OU 4-13 remedial actions.
- Results of the final inspections. (Any final inspection will be documented in the draft remedial action report, submitted to the Agencies' project managers within 60 calendar days of the final inspection, and used to resolve prefinal inspection issues.)

6. FIVE-YEAR REVIEW

In accordance with the “National Oil and Hazardous Substances Pollution Contingency Plan” (40 CFR 300), a review of the selected remedy will be conducted no less than every 5 years from the start of the remedial action for sites where contamination above risk-based concentrations is left in place. The remedial action at the CFA-08 sewage plant drainfield, which left contamination above the FRGs in place, was initiated in May 2002. As such, the first 5-year review for OU 4-13 is scheduled for completion by May 2007.

The current remedial design for the CFA-04 pond is based on the assumption that all contaminated material posing unacceptable risk will be removed from the site; however, if contamination is left in place, then institutional controls will be implemented and the 5-year review cycle will apply. The 5-year review will evaluate the remedy to determine if it remains protective of human health and the environment. The 5-year reviews will be conducted for remediated sites with institutional controls at least until 2095 (i.e., until the 100-year institutional control period expires) or until it is determined during a 5-year review that institutional controls and 5-year reviews are no longer necessary.

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